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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,155	03/24/2004	William P. Corbett	2003-0839.02	5269

21972   7590   08/24/2007
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EXAMINER
PHAM, HAI CHI

ART UNIT	PAPER NUMBER
2861	

MAIL DATE	DELIVERY MODE
08/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/808,155	CORBETT ET AL.
	Examiner	**Art Unit**	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 June 2007</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

　　4a) Of the above claim(s) *30-38* is/are withdrawn from consideration.

5)☒ Claim(s) *29* is/are allowed.

6)☒ Claim(s) *1-7,14-24,26 and 28* is/are rejected.

7)☒ Claim(s) *8-13,25 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1, 3-4, 19, 21, 23-24, 26 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kaneko (JP 4-317254) in view of O'Hara et al. (US 6,819,351).

Kaneko , an acknowledged prior art, discloses an image forming apparatus and

method for adjusting an image to compensate for bow/distortion or laser beam process

direction position errors, the method comprising reading image data from a first memory

location (memory lines FIFO (1) to FIFO (3)), said image data comprising pixels

arranged in a plurality of columns and a plurality of rows (Figs. 4, 6) ([0019]), performing

pixel shifts on select columns of said image data based upon a bow profile (shifting of

the selected pixels based on the setting data stored in ROM 32) that characterizes

process direction position errors of Pels written by a laser beam as it traverses generally

in a scan direction ([0020]), to define adjusted image data (by setting the timing of

corrected signals S1 to S7) ([0023]), and deriving a laser signal from said adjusted

image data such that said laser signal corresponds to said pixel shifted version of said

image data that is pre-warped in said process direction in a manner corresponding to

said bow profile (the corrected image data realigns the pixels in the process direction by

applying the right timing signal for each pixel in the main scanning line corresponding to the bow profile as defined by the signals S1-S7, the adjusted image data is used by the laser drivers to modulate the laser diodes) ([0021]-[0022]). With regard to claim 21, Kaneko also teaches a video processor configured to derive a laser signal suitable for processing by said printhead (each of the adjusted image signal Vd1 and Vd2 is delivered to the laser driver and converted into a modulation signal to modulate each of the laser diodes) ([0022]).

Kaneko fails to teach storing the adjusted image data to a second memory location (claims 1 and 21), and the second memory location storing the adjusted image data for less than the entirety of said image (claim 3), the second memory location is dimensioned to store at least two bands of adjusted image data (claim 5).

O'Hara et al., a previously cited art, discloses a coarse and fine bow correction for a writer provided with a line storage (179) to store the input image data, which is transformed into adjusted image data based on the bow profile data (CEPA 173), the adjusted image data being then stored in the data buffer to be used to drive the LED printhead (Figs. 14A-14B). O'Hara et al. also teaches the adjusted image data being stored for each scanning line at a time. O'Hara et al. further teaches the main scanning line being divided into plural segments for bow correction, and the adjusted image data for the main scanning line is stored in the data buffer.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the device of Kaneko with the data buffer as the second memory for storing the adjusted image data as taught by O'Hara et al. The

motivation for doing so would have been to set the image data ready for driving the light emitting element at the proper timing.

Kaneko also fails to disclose the bow processor being implemented in an application specific integrated circuit (claim 24).

O'Hara et al. discloses an electronic bow correction for an image forming apparatus, wherein the bow process (CEPA function) is implemented in an ASIC (col. 12, lines 8-30).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kaneko by implementing the bow process in an ASIC as taught by O'Hara et al. The motivation for doing so would have been to provide a versatile laser diver in a compact package.

Kaneko also teaches:

- (with reference to claim 4) organizing said image data into a plurality of bands wherein pixel shifts are performed on select columns of each band based upon said bow profile and said plurality of bands are processed one band at a time, and applying pixels shifts on select columns of the image data (the main scanning line is divided into plural blocks A-I, and the pixel shifts are performed on select columns in each block based on the bow profile) (Fig. 6) ([0022]),

- (with reference to claim 19) said pixel shifts are performed from the top to the bottom of said image by laser scanning,

- (with reference to claim 23) a third memory location (ROM 32), wherein said bow profile is stored in said third location as a plurality of instructions that describe the

process direction shifts for corresponding Pel positions along said scan path

required to compensate for said laser beam process direction position errors

(ROM 32 includes timing signal S1-S7 as correction data for shifting the pixels),

- (with reference to claim 26) said electrophotographic device comprises a color

  device, and said bow processor performs pixel shifts for each of the cyan, yellow,

  magenta and black image planes ([0007]-[0008]).

3.   Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko in

view of O'Hara et al., as applied to claim 1 above, and further in view of Yoshida et al.

(US 5,719,680).

       Kaneko in view of O'Hara et al. discloses all the basic limitations of the claimed

invention except for the first and said second memory locations comprising first and

second areas of a main system memory, the bow microprocessor.

       Yoshida et al., an acknowledged prior art, discloses a color printer and a method

for correcting skew in the scanning lines controlled by the microprocessor (MPU 51a),

wherein the image data is read into the ROM (51b), which also serves as a correction

data storage for correcting the scanning line skew, the skew correction.

       It would have been obvious at the time the invention was made to a person

having ordinary skill in the art to modify the device of Kaneko by providing the main

system memory having first and second areas for the first and second memories as

taught by Yoshida et al. The motivation for doing so would have been to provide a more

compact memory system to accommodate for the needs of image storage during the

bow process.

4.   Claims 14-18, 20, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kaneko in view of O'Hara et al., as applied to claim 1 above, and further in view of

Yoshida et al.

        Kaneko in view of O'Hara et al. discloses the instruction indicating which pixel in

the different groups of pixels is to be shifted or corrected, the instruction being a 2-bit

word that represents image shift for each pixel, and the shift of the pixels being

performed relative to adjacent columns or segments (O'Hara et al., col. 10, line 53 to

col. 11, line 21) and the pixels being shifted up, down or not shifted along the process

direction (O'Hara et al., Figs. 3, 7), but fails to teach the specific instruction for the

shifting of the pixels, the instruction being a one-bit instruction indicating the up or

down-shifting of the pixels, constraining said instructions according to rules that limit the

number of process direction shifts that can be corrected, and the instructions being

constrained to limit the maximum amplitude of pixel shifts allowable in said bow profile.

        Yoshida et al. discloses a color printer and a method for correcting skew in the

scanning lines controlled by the microprocessor (MPU 51a), wherein the image data is

read into the ROM (51b), which also serves as a correction data storage for correcting

the scanning line skew, the skew correction further including a one-bit instruction

specifying left-down skew or left-up skew for correction is provided to operate the DIP

switch 53, and wherein the correction data limit the shift of the pixels up to 5 pixels in either directions depending on the amount of skew (col. 5, lines 1-6) (Figs. 4, 9).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kaneko by providing the bow correction instruction configured with one-bit instruction for the indication of the up or down-shifting of the pixels and to restrict the maximum amplitude of pixel shifts allowable in the bow profile as taught by Yoshida et al. The motivation for doing so would have been to provide a complete instruction for effectively shifting the pixel to the appropriate position with a reference line.

5.   Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko view of O'Hara et al., as applied to claim 4 above, and further in view of Kerby et al. (US 6,445,404).

Kaneko in view of O'Hara et al. discloses all the basic limitations of the claimed invention except for the second memory location is dimensioned to store at least two bands of adjusted image data, a first band of adjusted image data is processed from said second memory location for deriving said laser signal while pixel shifts are performed on said image data according to said bow profile such that a second band of adjusted image data is stored in said second memory location, and processing of said first band of adjusted image data to derive said laser signal must be complete before storing a third band of adjusted image data into said second memory location.

Kerby et al. discloses an image forming apparatus provided with a single laser

diode and two dedicated line buffers for providing signals to drive the laser diode,

wherein after driving the laser diode with the raster data stored in the first line buffers,

the laser diode is then driven by the raster data contained in the second line buffer while

the first line buffer reads in new (i.e., third) raster data, the switching between the two

line buffers continues until the print image is complete (col. 7, lines 55-67).

It would have been obvious at the time the invention was made to a person

having ordinary skill in the art to provide the device of Kaneko with a storage containing

two bow-corrected lines of pixel data and the switching configuration of the line data

memory for recording the image data as taught by Kerby et al. the motivation for doing

so would have been to obtain an efficient use of the memory and a high speed image

recording.

6.   Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko

in view of O'Hara et al., as applied to claim 21 above, and further in view of Baldwin (US

5,764,243).

Kaneko view of O'Hara et al. discloses all the basic limitations of the claimed

invention except for the image data is transferred to said bow processor and said bow

processor writes said adjusted image data to said second memory location using direct

memory access transactions.

Baldwin teaches a computer processing method for transferring image data into FIFO memory using direct memory access transactions so as to automatically ensure that there is room in the FIFO before it performs further transfers (col. 15, lines 8-37).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the bow microprocessor in the modified device of Kaneko with the DMA controller during the image data transfer as taught by Baldwin. The motivation for doing so would have been to prevent overflow of the memory to occur as suggested by Baldwin.

Allowable Subject Matter

7.   Claim 29 is allowed.

8.   Claims 8-13, 25 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

9.   Applicant's arguments with respect to claims 1-7, 14-24, 26 and 28 have been considered but are moot in view of the new grounds of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HAI PHAM
PRIMARY EXAMINER

August 19, 2007